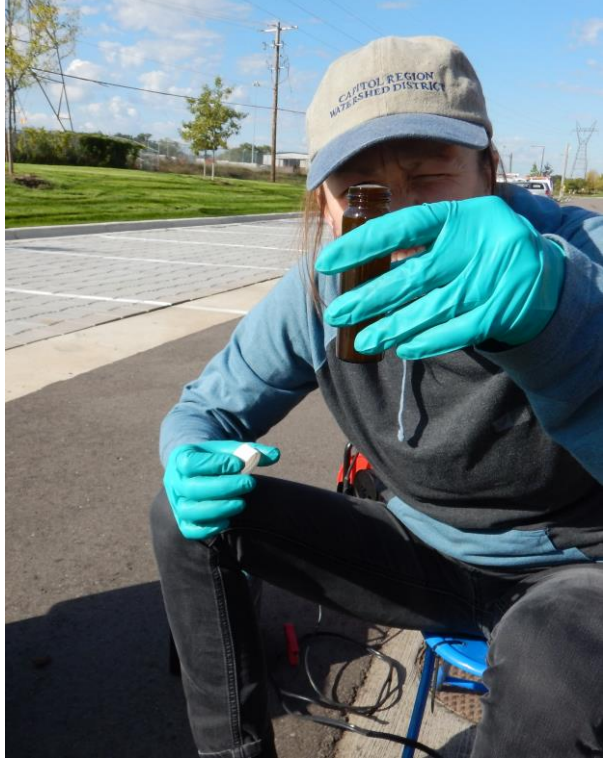
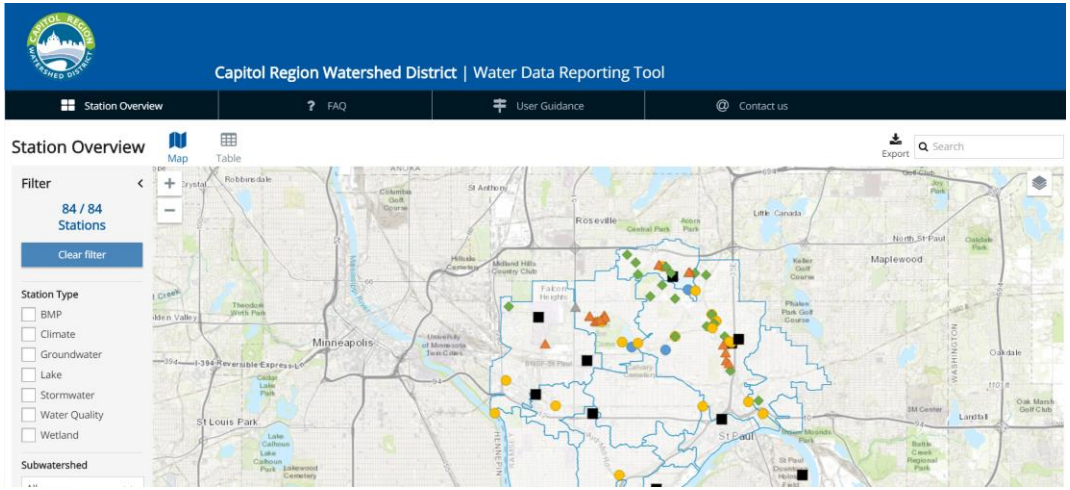




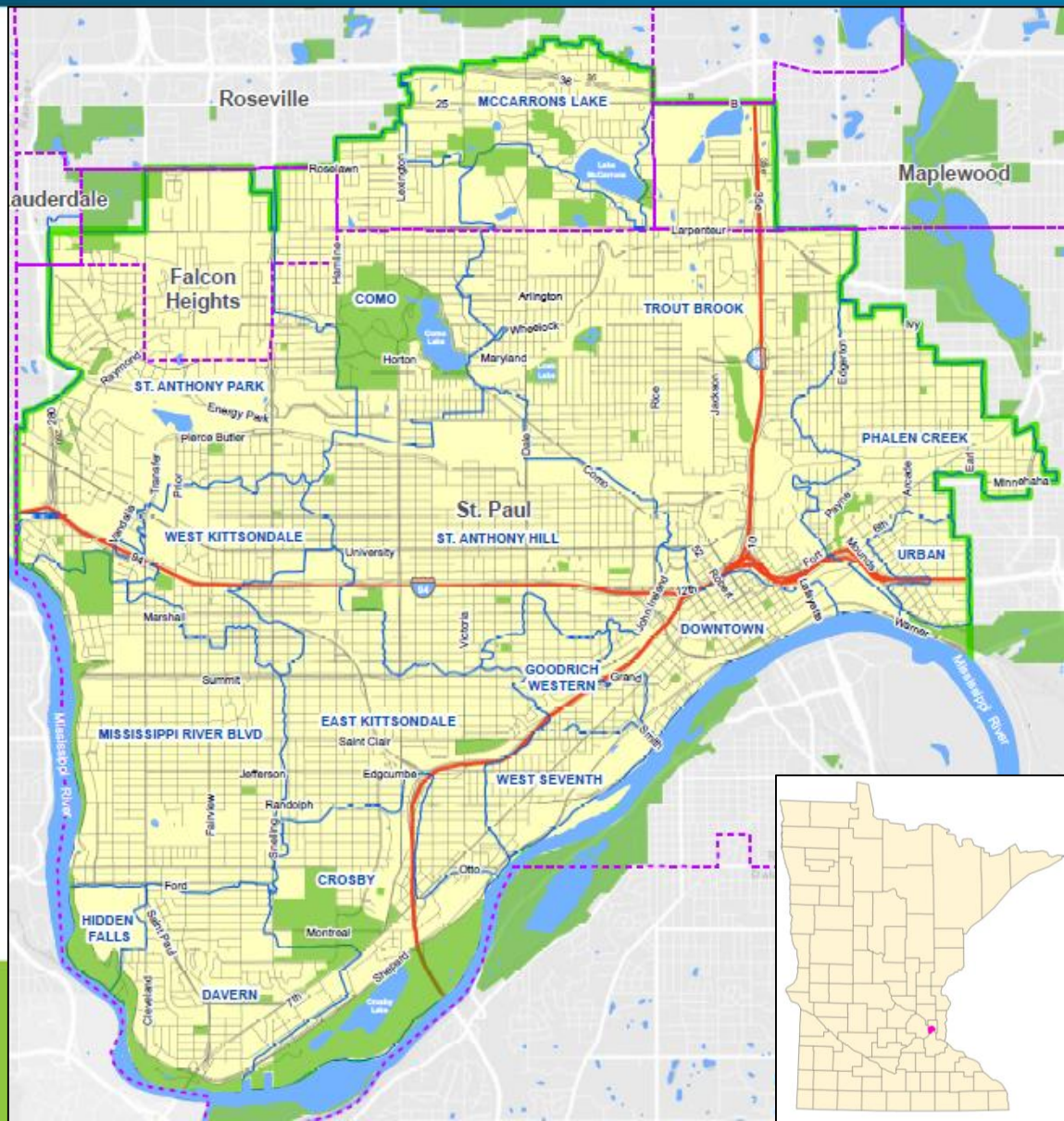
MONITORING PROGRAM EVOLUTION: IMPROVING EFFICIENCY, ACCURACY, AND CONSISTENCY

JOE SELLNER
Water Resource Specialist

MARCH 28, 2019

Capitol Region Watershed District

- St. Paul, Minnesota
- Local unit of gov't
- Drainage area: **41 mi²**
  - 5 lakes
  - 13 mi. of Mississippi
  - Storm sewer network
- Highly urbanized
  - **42%+** impervious
  - Population: **245,000**
- 14-yr monitoring program foundation of CRWD



CRWD Monitoring Dataset

- Over **115** stations since 2005:
  - Data types:
    - Discrete (Lakes, Wetlands, Precip, WQ)
    - Continuous (Level, Velocity, Discharge)
    - Qualitative (Wetlands)
  - 14 seasons of monitoring data
    - Millions of data points
- Dataset continues to grow!

Monitoring Program Evolution

2014 Program Review

- **What do we do well?**
- **Why monitor in CRWD?**
- **How can our monitoring data be used in other CRWD programs?**
- **Who are the audiences for our data?**
- **What do our audiences need to effectively make use of our data?**
- **Who are potential new monitoring program partners who could strengthen our work?**
- **What changes can we make to improve the *efficiency* of our data collection?**
- **To best use our finite resources, where are areas we could reduce or eliminate collection efforts?**
- **Is there anything that should be *added* to the program?**

2014 Program Review

Impediments:

1. Staff time
   - Routine field activities take too much time
2. Data management
   - Lack of good solution for organization, processing, and access

Staff knowledge and skills not fully being put to use

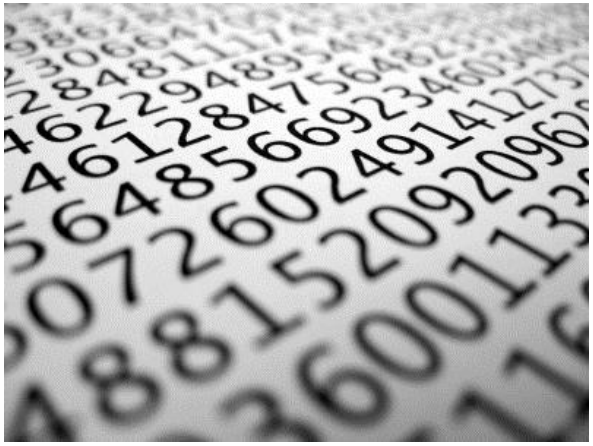
Improvement Areas

1. Data Management
2. Monitoring Efficiency and Reliability
3. Reporting
4. Monitoring Planning

1. Data Management

Data Management Issues

- **Lots of data!**
  - Historically organized in Excel Files
- **Issues:**
  - Data fragmentation-- no data continuity
  - Inconsistency between years
  - Limited data processing/QAQC capabilities
  - Data sharing difficulties



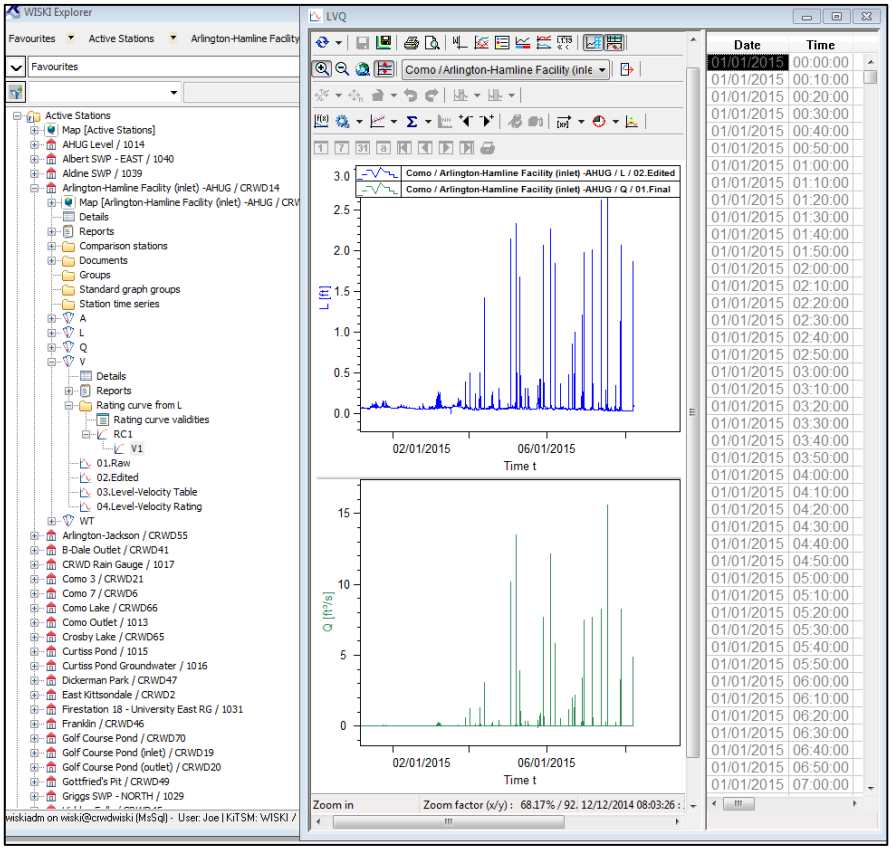
- **Overall, data management time consuming & inefficient**
- **Needed a data management solution to improve:**

Efficiency, Consistency, Accuracy

Kisters WISKI

Water Data Management Software

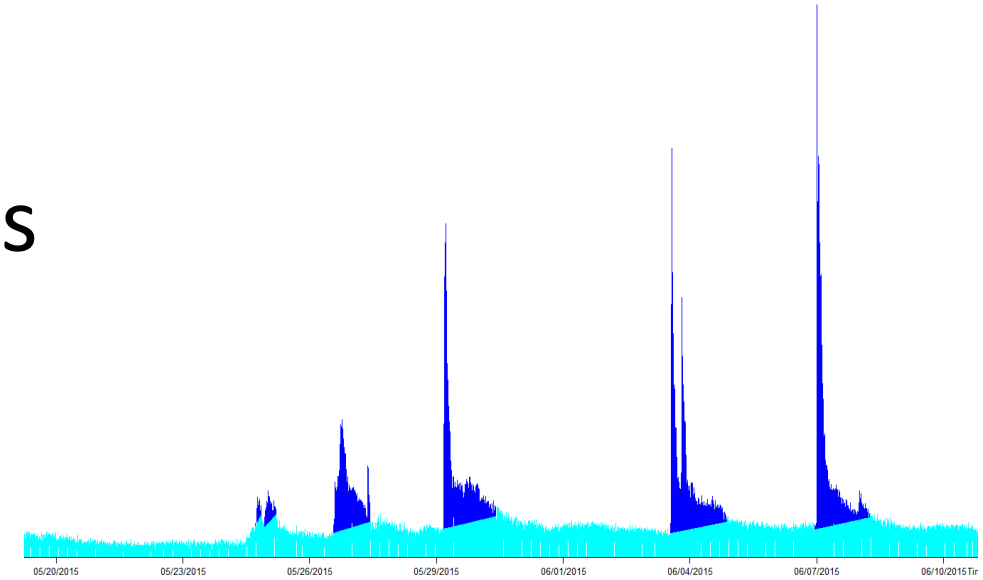
- Continuous & discrete data
- Data analysis
- Data editing
- Data processing



Automation

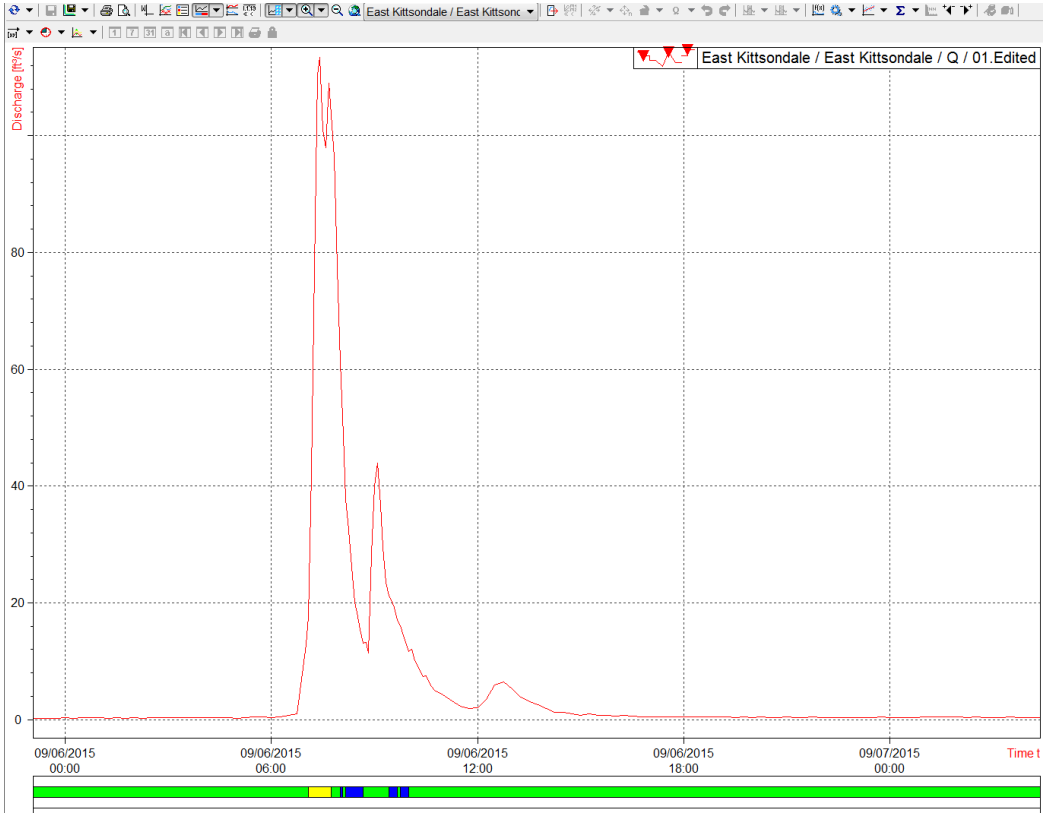
Converted from Excel:

- Baseflow/event flow separation
- Baseflow totals
- Event flow totals
- Loads
- Statistics



Improved Workflow

- Data editing and edit tracking
- Quality coding
- On-the-fly calculations aid analysis



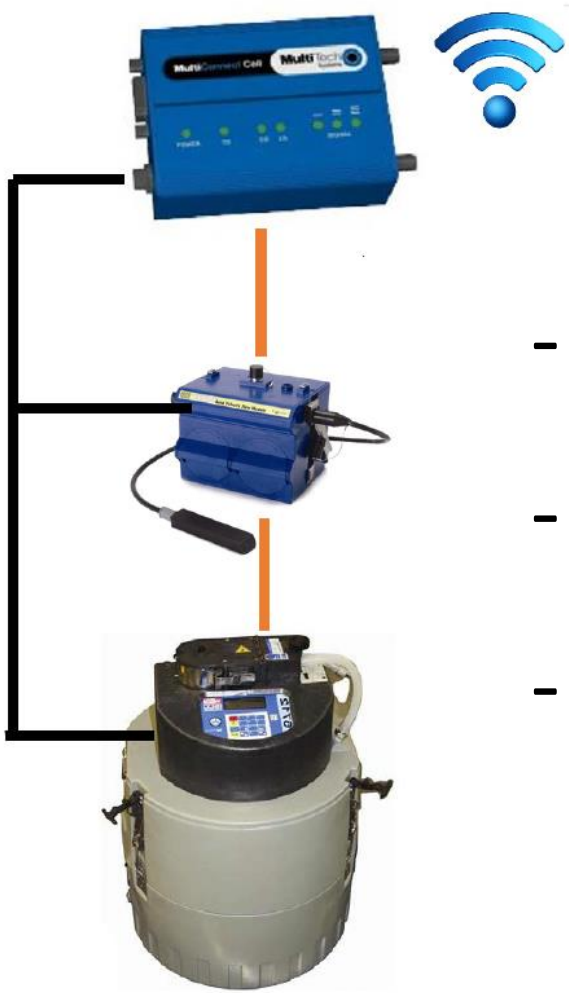
2. Monitoring Efficiency & Reliability

Reliable Power

Solar or AC power installed at stormwater stations

- Eliminated need for frequent battery chances
- Less data loss due to power failure

Telemetry

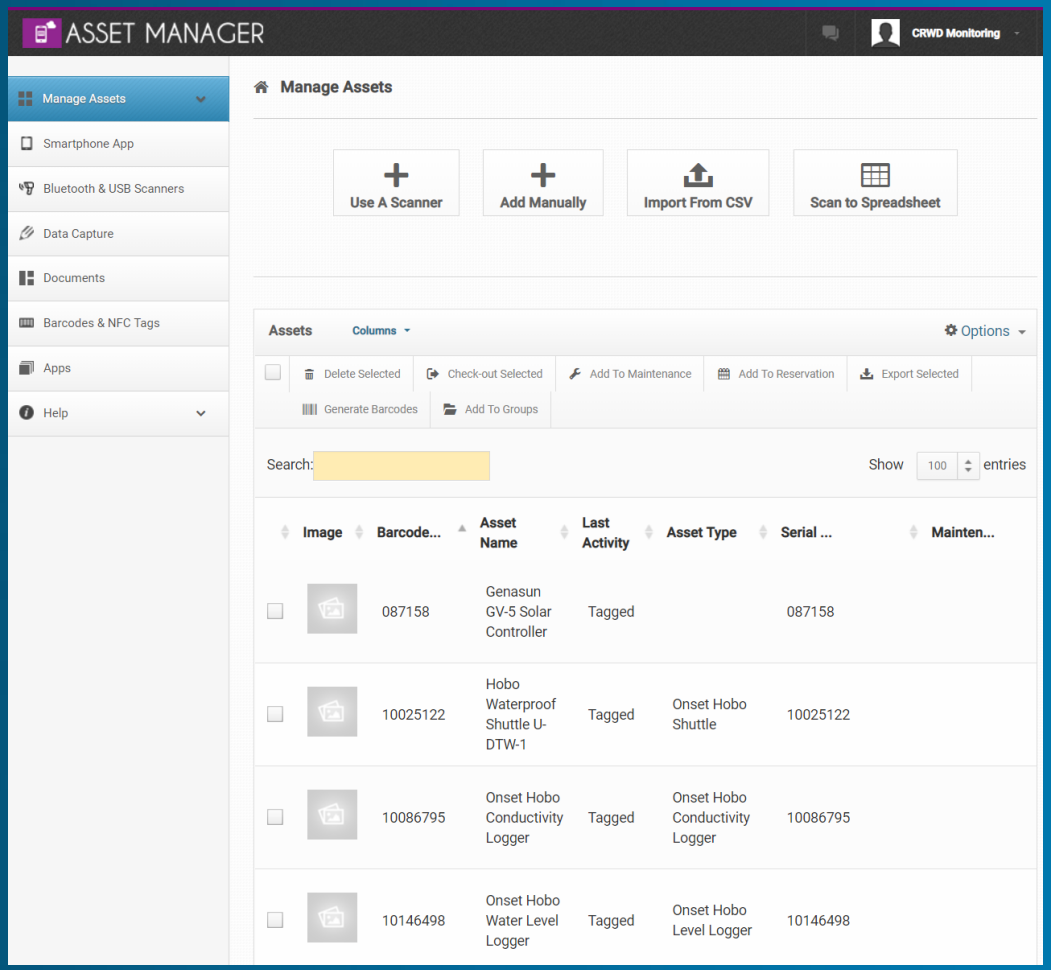


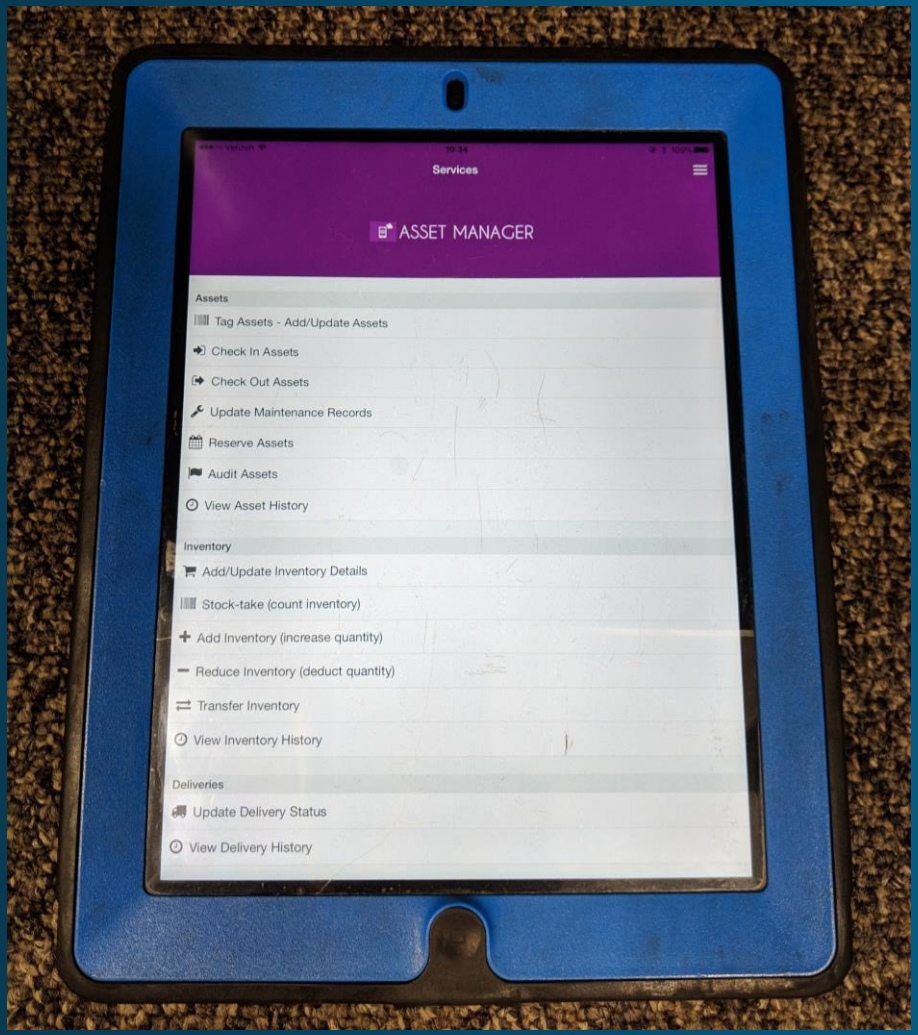
- Automated Data Import
- Remote Programming
- Station Data and Sampler Status

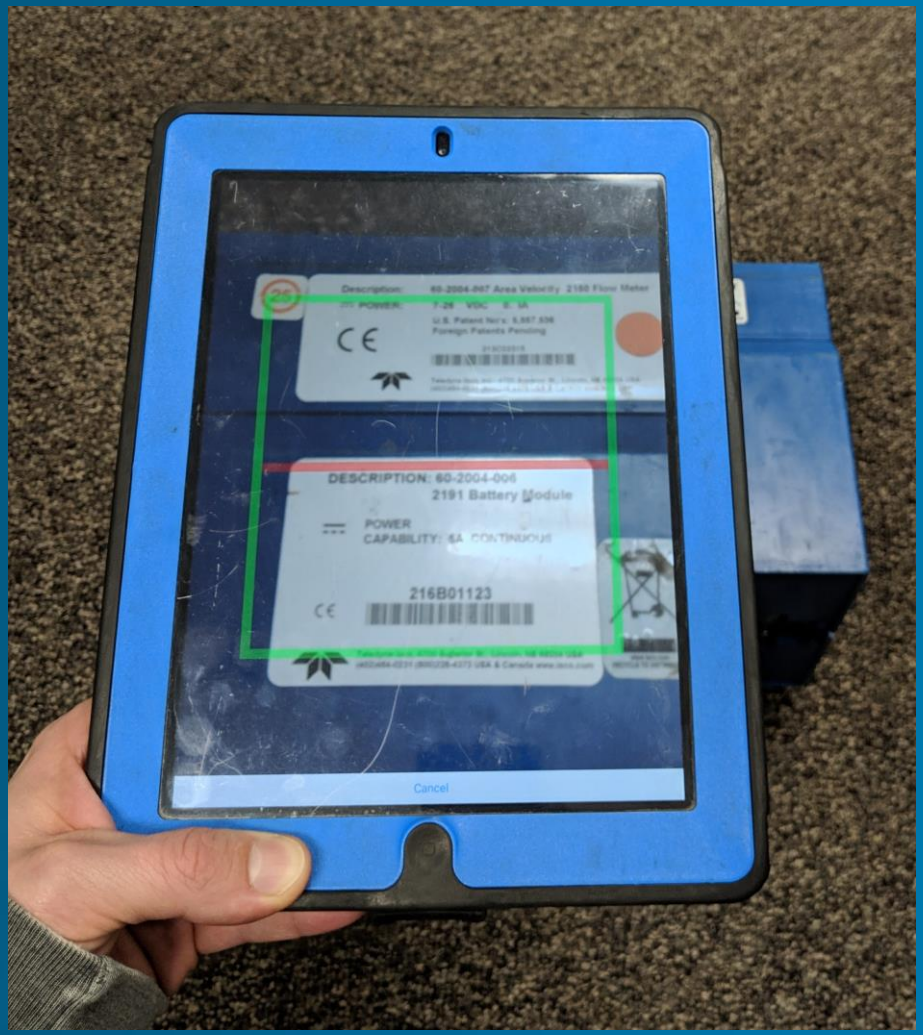
Asset Management

- Location tracking
- Repair history
- Equipment age

Increased Reliability







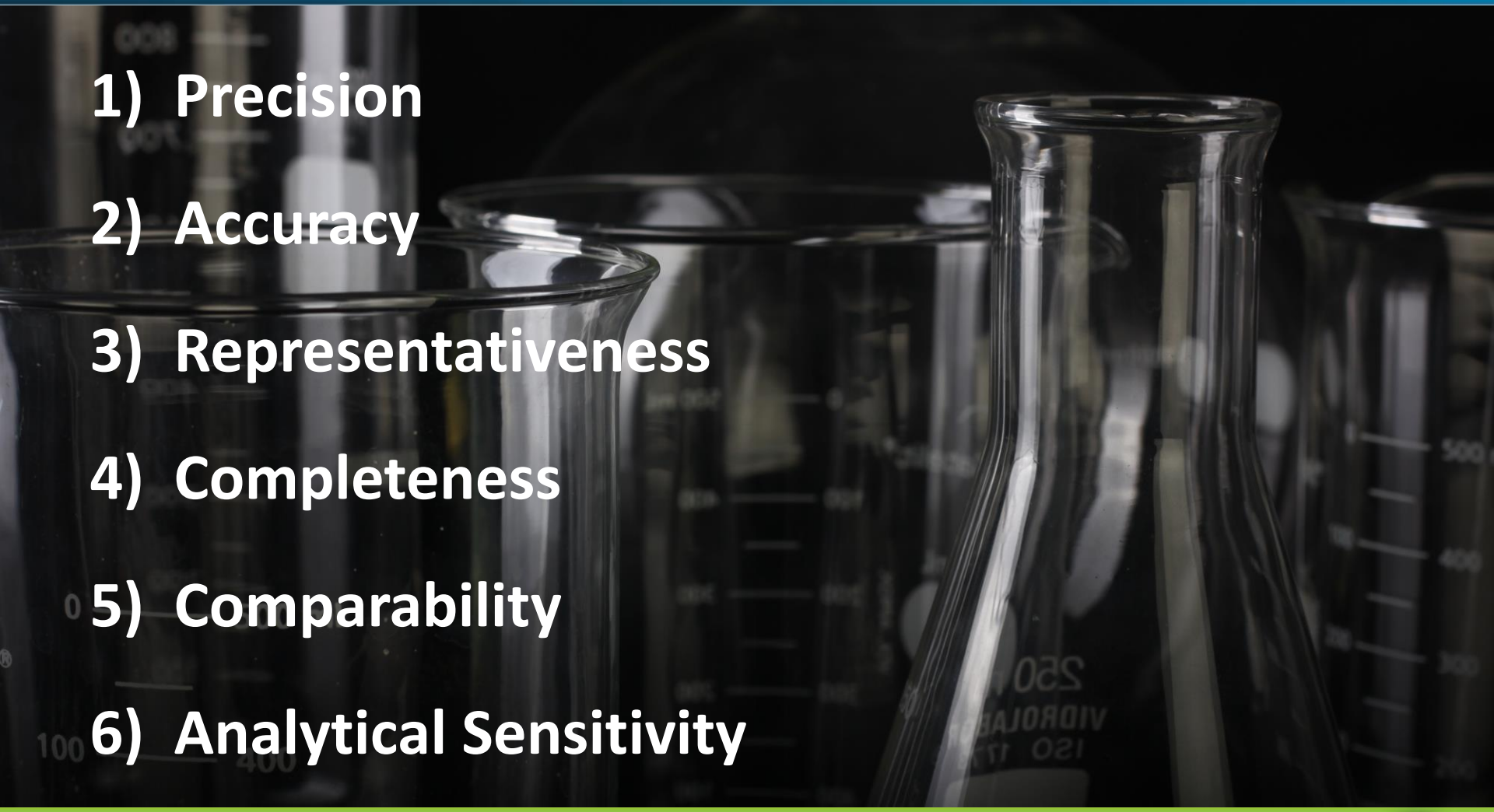
https://ai.ventipix.com/

Quality Assurance Program Plan

- Defines quality assurance goals and procedures

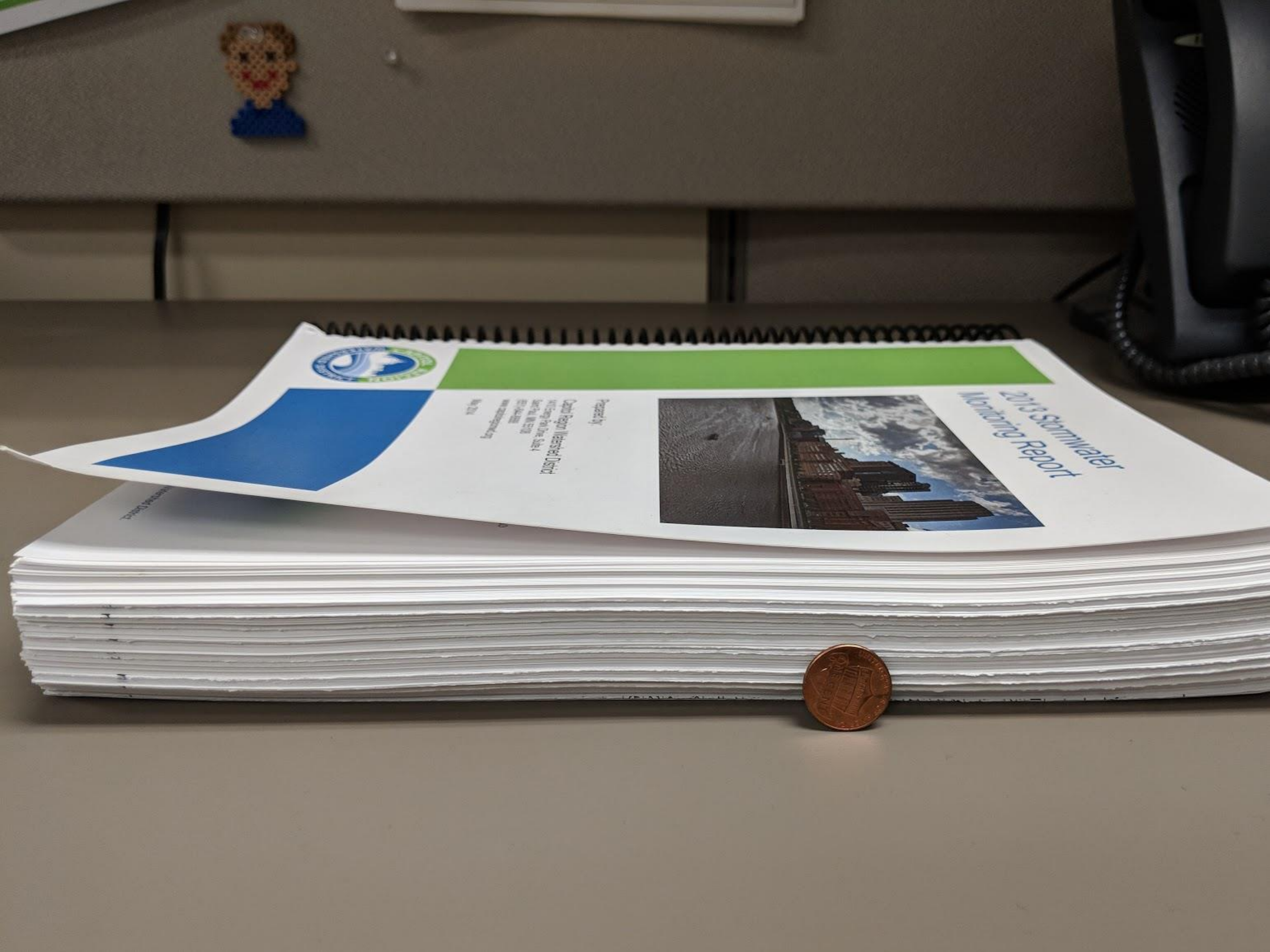
- Summarizes the monitoring program design, sampling methods, analytical procedures, and data review protocols.

Quality Assurance Objectives



1) Precision
2) Accuracy
3) Representativeness
4) Completeness
5) Comparability
6) Analytical Sensitivity

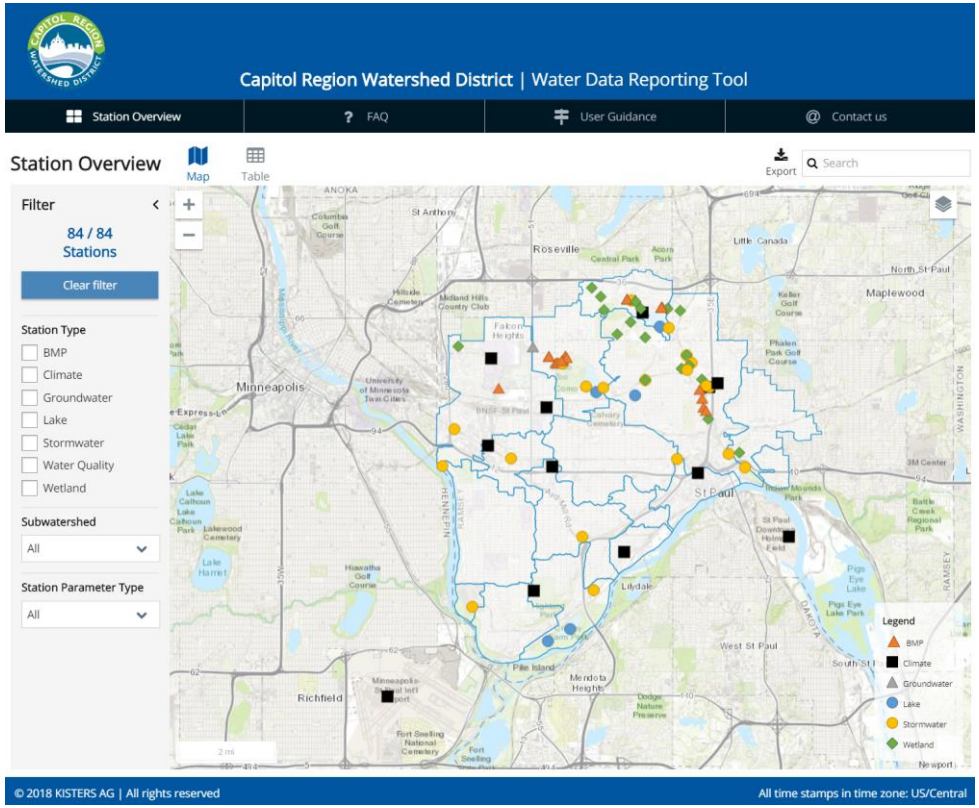
3. Reporting


2013 Stormwater
Monitoring Report
Prepared by:

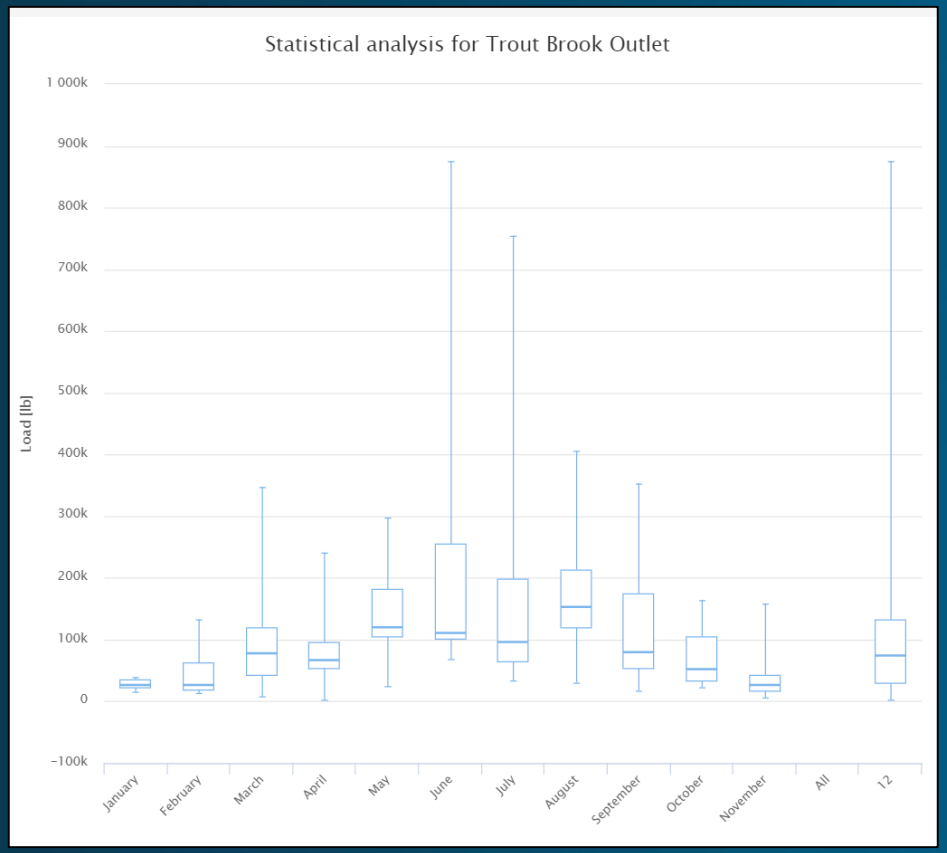
User-driven Data Delivery

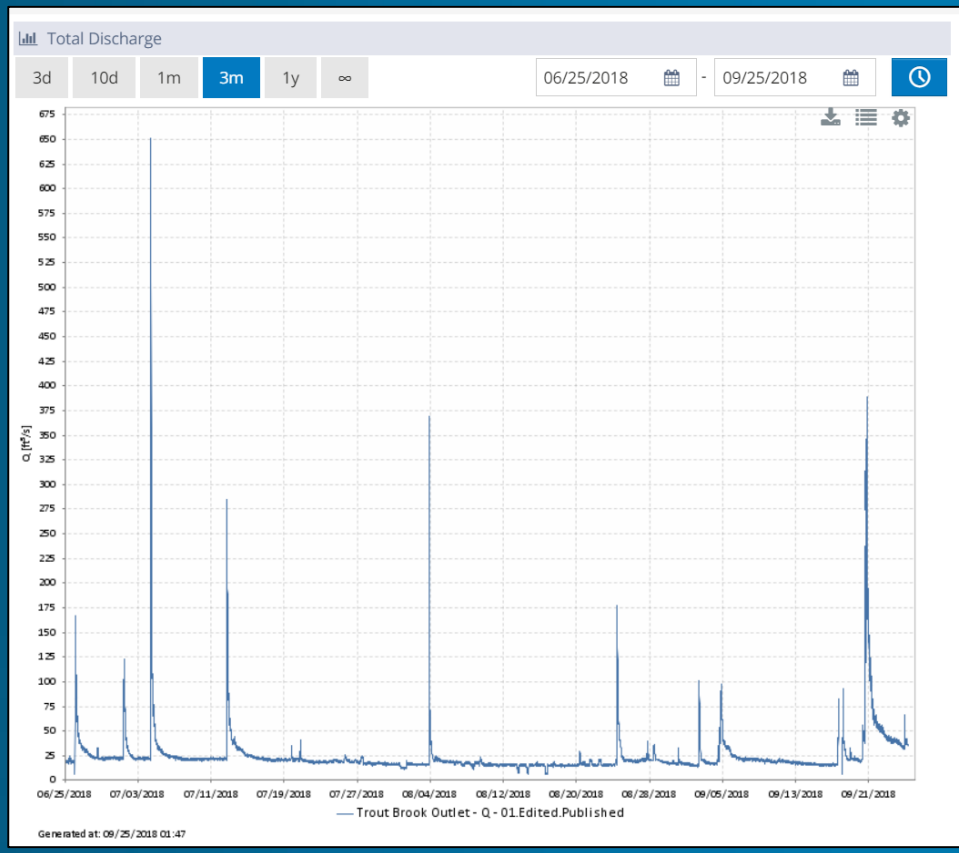
http://waterdata.capitolregionwd.org

- Visualization
- Statistics
- Data access



Water Data Reporting Tool





http://waterdata.capitolregionwd.org

CAPITOL REGION WATERSHED DISTRICT

4. Monitoring Planning

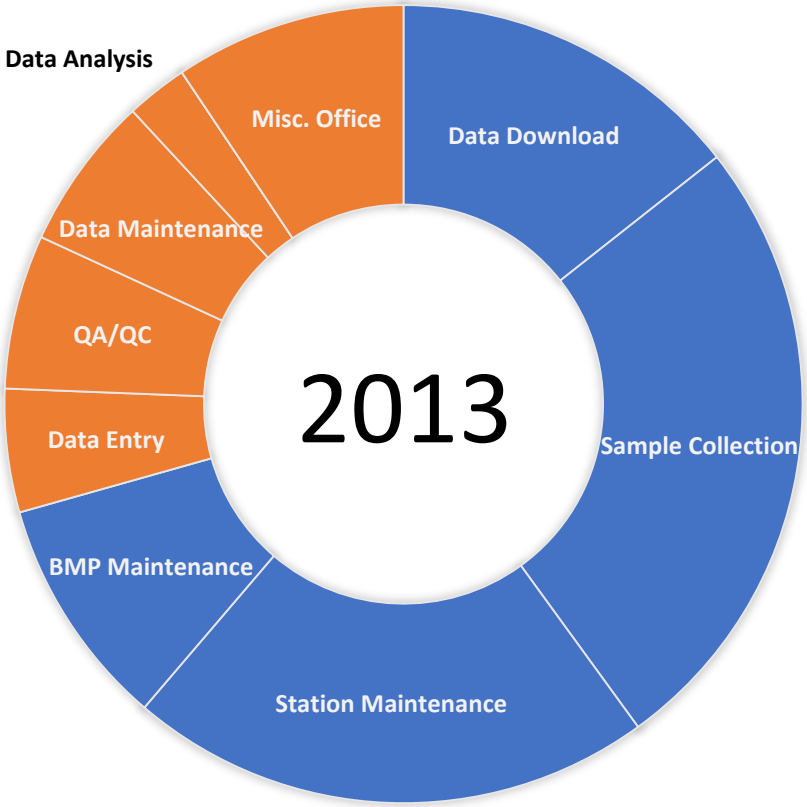
Monitoring Philosophy

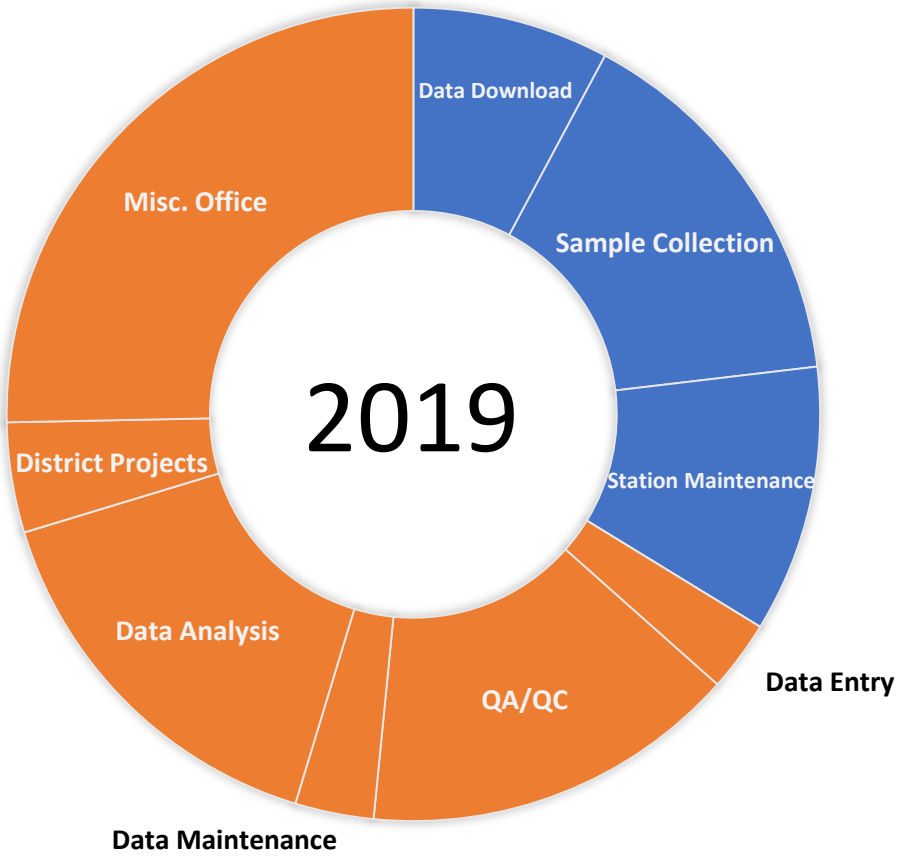
- Make sure monitoring has a purpose.
- Ensure site selection, sampling frequency, monitoring goals all fit with purpose
- Analyze and put data to use
- Report and share data

2019 Monitoring Program

- Streamlined field work, data management, reporting
- Support and initiate District projects
- More analysis of collected data

Monitoring Technician Tasks





Office Tasks

Field Tasks

Successes, Setbacks, Lessons Learned

1. All transitions have hiccups – expect them
2. Every organization is different
3. Take advantage of your staff's strengths
4. Take time for real self-reflection
5. Up-front costs can seem daunting, but increases in productivity and efficiency are worth it

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www.capitolregionwd.org